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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,234	12/06/2001	Masatoshi Anma	50090-458	4496

7590 11/21/2002  
McDermott, Will & Emery  
600 13th Street, N.W.  
Washington, DC 20005-3096

EXAMINER

SEFER, AHMED N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 11/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/003,234

Applicant(s)

ANMA, MASATOSHI

Examiner

A. Sefer

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. The amendment filed on 9/3/02 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 1-5 and 8-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee US Patent 6,277,705.

Lee discloses (see figs. 1 and 2 and col. 3, lines 11- 15) a semiconductor device comprising a substrate 10; a first interconnection 12 formed on said substrate; a first dielectric film 14 covering said first interconnection; an opening section 18 extending from a surface of the first dielectric film to said first interconnection, said opening section being formed in said first dielectric film; a plug 20 formed in said opening section and electrically connected to said first interconnection; a second interconnection 22 having a barrier metal layer and an aluminum interconnection formed on the barrier metal layer (as in claims 2 and 4) formed over said plug; a predetermined void 26 between said

plug and said second interconnection; and a second dielectric film 24 covering said second interconnection.

As to the formation of the said void by various means recited in claims 2-5, "product by process" claims are directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685 and *In re Thorpe*, 227 USPQ 964, 966. Therefore, the way the product was made does not carry any patentable weight as long as the claims are directed to a device. Further, note that the applicant has the burden of proof in such cases, as the above case law makes clear. Also see MPEP 2113.

Regarding claims 8-12, it is inherent to apply a voltage to an interconnection to cause an electromigration thereby establishing a communication.

4. Claims 6, 7, 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee US Patent 6,277,705.

Lee discloses (see figs. 1 and 2 and col. 3, lines 11- 15) a semiconductor device comprising a substrate 10; a first interconnection 12 formed on said substrate; a first dielectric film 14 covering said first interconnection; an opening section 18 extending from a surface of the first dielectric film to said first interconnection, said opening section being formed in said first dielectric film; a plug 20 formed in said opening section and electrically connected to said first interconnection; second interconnection 22 formed on said first dielectric film in the vicinity of said plug; a second dielectric film 24 covering said second interconnection; and a predetermined void 26 in said second dielectric film

and located at a position adjacent to said second interconnection and at a position above said plug.

Regarding claim 7, Lee discloses a second interconnection formed so as to become narrow in the vicinity of said plug.

Regarding claims 13 and 14, it is inherent to apply a voltage to an interconnection to cause an electromigration thereby establishing a communication.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anna et al. US Patent No. 6,319,812 in view of Nakagawa et al. US PG-Pub 2002/0050651.

Anna et al disclose in fig. 1 a semiconductor device comprising a substrate and; a first dielectric film 16 formed on said substrate and having an opening section; a pad 18 formed in the opening section and having conductivity; a first interconnection 20 formed on said first dielectric film such that a portion of the bottom of said first interconnection comes into contact with an upper surface of said pad; a second interconnection 1 formed on said first dielectric film such that a portion of the bottom of said second interconnection does not come into contact with the upper surface of said

pad, said pad being disposed between said first and said second interconnections; and a second dielectric film 2 covering said first and second interconnection, but do not disclose a predetermined void.

Nakagawa et al disclose in fig. 16 a predetermined void 117 in a dielectric film 107.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teachings Nakagawa et al with the device of Anma et al, since that would reduce the parasitic capacitance.


Regarding claim 16, Lee discloses a second interconnection formed so as to become narrow in the vicinity of said plug.

Regarding claims 17 and 18, it is inherent to apply a voltage to an interconnection to cause an electromigration thereby establishing a communication.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (703) 605-1227.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on (703) 308-6601.

ANS  
November 18, 2002

  
NATHAN J. FLYNN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800